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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/510,602 | 05/13/2005 | Jong-Po Jeon | 8947-000116/US | 1786 |

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| EXAMINER |
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KORNAKOV, MICHAIL

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| ART UNIT | PAPER NUMBER |
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1746

DATE MAILED: 03/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/510,602

Applicant(s)

JEON ET AL.

Examiner

Michael Kornakov

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 May 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 October 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>10/12/2004</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. Figures 1 and 2 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

2. The disclosure is objected to because of the following informalities: Page 7, line 5 recites H_2N_2 gas, which is not readily ascertainable. Apparently, a mixture of N_2 and H_2 is indicated. Appropriate clarification and/or correction is required.

3. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o).

Claim 5 recites that "reaction gas comprises one or more of O_2 , N_2 , H_2N_2 , O_3 or CF_4 ". However, the instant specification does not apparently provide for the all recited combinations of gases and therefore appropriate correction of the instant specification is required.

Claim 8 recites "a pad-etched substrate", which is apparently not indicated by the instant specification.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1-9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation "the photoresists" in line 11. There is insufficient antecedent basis for this limitation in the claim because the term "photoresists" was not recited or indicated by any step, preceding to an ashing step, wherein "the photoresists are removed". The term "photoresists" also constitutes an indefinite subject matter, because it is not clear what the plural meaning of photoresist (photoresists) is attributed to.

Claim 5 recites "H₂N₂" gas, which is not readily ascertainable. Appropriate clarification and/or correction is required.

Claims 2-4, 6-9 are rejected because of their dependency and failure to remove the ambiguity of parent claim.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

7. Claims 1-6 are rejected under 35 U.S.C. 102(a) as being anticipated by Wang et al (U.S. 6,409,932).

Wang teaches an ashing method comprising placing a wafer on a hot chuck, heated to 250oC and heating the wafer for the period of time ranging from 5 to 7 sec, while maintaining the pressure in the processing chamber between 10 Torr and 700 Torr; vacuumizing the processing chamber to about 1.7 Torr, while keeping the wafer on the chuck; introducing reaction gas into the processing chamber and ashing photoresist from the wafer (col. 4, lines 7-17; paragraph bridging col. 5 and 6; col.6, lines 13-65). As the reaction gas(es) Wang names hydrogen/nitrogen, oxygen, CF₄ (col.9, lines 11-13, 34-36). The wafer of Wang may be dopants implanted (col.8). Therefore, all the limitations of the instant claims are met by Wang.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

11. Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang et al (U.S. 6,409,932).

Wang does not specifically indicate that the photoresist is ashed from a via etched or a pad etched wafer. However, Wang teaches that the principles and advantages of his disclosure can be applied to a number of low pressure treatments. Therefore, one skilled in the art motivated by Wang would have found obvious to apply the ashing method of Wang while removing photoresist from via etched or pad etched wafers with the reasonable expectation of success.

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12. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wang et al (U.S. 6,409,932) in view of Mohondro et al (U.S. 6,406,836).

Wang remains silent about an overashing step. However, the overashing is conventionally utilized in the art in order to assure complete removal of photoresist and other residual materials from wafer surfaces. Thus, for example, Mohondro teaches that in order to remove residual material left after photoresist ashing, the ashing step is followed by an overash step, utilizing the plasma previously generated at ashing, thus removing all polymeric materials from the semiconductor structure (col.3, lines 35-40). Therefore, one skilled in the art motivated by Mohondro would have found obvious to proceed with overashing upon ashing in order to assure complete removal of photoresist and other polymeric residues from the wafer of Wang.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Kornakov whose telephone number is (571) 272-1303. The examiner can normally be reached on 9:00am - 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Barr can be reached on (571) 272-1414. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read "M. Kornakov", with a stylized flourish at the end.

Michael Kornakov
Primary Examiner
Art Unit 1746

03/06/06